

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Federal-State Joint Board on
Universal Service

)
)
)
)
)

CC Docket No. 96-45

DOCKET FILE COPY ORIGINAL

COMMENTS OF APPLE COMPUTER, INC.

In response to the request of the Common Carrier Bureau, see PN DA-96-1891 (rel. Nov. 18, 1996), Apple Computer, Inc. ("Apple") hereby submits these comments in the above-referenced proceeding.¹ In these comments, Apple addresses the need to raise the threshold of what is considered "sufficient" with respect to certain universal service capabilities. The comments also address the regulatory steps that must be taken to extend the reach of user-provided communications resources.

The sheer magnitude of the task of implementing universal service in its most basic form and extending it to schools, libraries and rural health care providers appears to be overwhelming. Fortunately, we are not presented with a paralyzing conundrum. There are forces available to carry out these tasks, but they must be recognized and applied. Missing from the Joint Board Report is recognition of arguably the most valuable asset: users of universal services, who can establish some of their own connection capabilities, especially where service provider alternatives are too few, too costly, or not available at all.

Competition, especially that resulting from empowering users to provide their own facilities, should be explicitly encouraged, and universal service goals should be continually reevaluated as wire and wireless technologies evolve.

¹ Apple previously submitted comments on the Notice of Proposed Rulemaking and Order Establishing Joint Board, issued March 8, 1996.

DISCUSSION

I. BACKGROUND

The scope and the detail of the Recommended Decision of the Federal-State Joint Board² ("the Joint Board's Report" or "Report") reflect both the importance of achieving universal service and the complexity of doing so. Congress, the Joint Board, and the Commission have established priorities that extend eligibility for universal service to include the connection of schools, libraries and rural health care providers. These priorities raise the level of universal services from minimal "lifeline" connections to include capabilities that make universal services an integral part of the National Information Infrastructure.

In accordance with the Joint Board's charter, the Report concentrates on the roles, revenues, and responsibilities of regulated service providers (and their regulators), and views universal service largely from within a common carrier/service provider framework. It would be a mistake, however, to focus exclusively on carrier/provider "solutions" as the only response to all universal service connectivity needs. This is not to say, however, that Apple quarrels with a service provider emphasis. In fact, Apple and others in the information industry generally welcome every option that allows the users of our products and services to communicate with one another and access information at varying distances, costs, convenience, bandwidths, reliability, and timeliness.

As the leading provider of computer technology for education, moreover, Apple is deeply involved in the technological, social, and cultural issues that influence the educational process. Apple is active in developing new technologies that will tap the talents and energies of individuals and entities who are willing to take on the challenges of "wiring" schools, connecting libraries, and serving rural health care facilities.³ With respect to such users, Apple believes strongly in the need for a wide range of affordable, effective communications capabilities and options from which users can select those that meet their increasingly expanding needs. Thus, Apple seeks to look considerably beyond today's commonly-measured, minimal baseline goals for sufficient universal service access and bandwidth.

² Released November 8, 1996, in compliance with Section 254 of the Telecommunications Act of 1996.

³ See Apple NII Band Petition for Rulemaking, RM-8653 (filed May 24, 1996); Apple Data-PCS Petition for Rulemaking, RM-7618 (filed Sept. 13, 1993).

II. SERVICE REQUISITES FOR SCHOOLS, LIBRARIES AND HEALTH CARE PROVIDERS

A. Sufficient Bandwidth

As recently as three or four years ago, few would have said that all schools should have Internet access at all, but, today, a link to the Internet should be viewed as an educational necessity. Information traffic within organizations and through the Internet no longer consists predominately of e-mail messages, but is, instead, a "multimedia" mixture that includes sizable text files, pictures, music, graphics, scientific and medical data, nearly real-time voice and video communications, and interactive personal communications. This type of multimedia mixture can provide a rich educational environment for all students that they otherwise would not be able to experience. The idea that a 28.8 kbps modem connected to a single dial-up telephone line offers a school population an adequate thoroughfare to reach the Internet is not consistent with today's realities.⁴ ISDN and even T1 (1.544 Mbps) connections barely suffice today.

The main reason ISDN and T1 rates continue to serve as the goal of today's efforts to connect schools to the information superhighway is that, viewed from where we are today, they represent an enticing view of a high-capacity transmission thoroughfare. Viewed from where we must be to keep pace with the information explosion of tomorrow, universal service must be provided at significantly higher levels of performance and access than now are considered adequate.⁵

Deciding what constitutes a minimal level of connectivity that meets universal access standards is a moving target. Moreover, it is not an *individual's* information transfer requirements that establishes the threshold of sufficiency, but the *aggregate* requirements of *all* persons (and devices) simultaneously sharing a particular channel, wire, piece of spectrum, cable or fiber, as well as the capacity of routers and servers to contain and process information and direct its flow.⁶ These aggregate

⁴ Apple's comments may appear to focus on education alone, but the Commission's inquiries in the Public Notice address "telecom needs of rural health providers and cost-effective ways to provide them" as well as "the costs and benefits for extending 1.544 Mbps connections for rural health care." One must consider that the universal service connection might well be shared in a school by hundreds of students, dozens of educators, front-office administrators, and parents and families. The equivalent is true of medical care organizations. Libraries, particularly those outside urban areas, often are the essential place where community interests are identified and realized.

⁵ Indeed schools, particularly, are not waiting for the year 2000 to be "connected."

⁶ Network descriptions need to be evaluated carefully. Overall throughput capacity, and the share of that capacity available to any one user, can be disconcertingly different and, of course,

minimums apply also to a service provider's connection point to the national infrastructure and, in the case of Internet Service Providers (ISPs), to the Internet.⁷

The universal service mandates for institutions will be fulfilled only when there is "enough" bandwidth for every individual. With "enough" bandwidth, students and teachers will be able to communicate with others — in neighboring classrooms or in distant countries — to reach beyond the physical limitations of the classroom. Students who never would be able to visit the Library of Congress will have instant access to that vast repository of knowledge; works of art in museums all over the world can be seen, studied and appreciated "up close"; video conferencing of classrooms, laboratories and lecture halls around the globe will open the doors to cultural and educational exchanges never before possible for the vast majority of students. The benefits are clear. It is less clear how we make them accessible.

Apple believes that, at this juncture, universal service for a school, library or rural medical facility must, at a minimum, be referenced to the equivalent of at least one dedicated T-1 (1.544 Mbps) line, with that capacity controlled by the organization consuming the service. In the near future, universal service will have to comprise a full range of additional digital services, with bandwidths ranging between at least 45 and 100 Mbps.

B. Ubiquitous Access And "Inside Wire"

Beyond "sufficient" bandwidth, adequate information access will require multiple connections in every classroom and school. Educators identify the difficulties of gaining physical access to in-school networks as the second greatest deterrent (after raw costs) to effective use of computers in the classroom and curriculum.⁸ Similar barriers are observed in hospitals, where patient care must be provided throughout a facility and real-time record keeping is a necessity.

subject to dynamic variations depending on traffic loads (and in the case of wireless networks, also dependent upon propagation and interference).

⁷ The Public Notice asks about ISPs and their deployment in rural areas. See PN-96-1891 at 2. Apple's Petition for a NII Band, RM-8653, drew comments to the FCC from a number of ISPs throughout the country. Many described instances whereby land-line telephone company services capable of providing, e.g., T1 rates were extraordinarily expensive, adding thousands of dollars monthly to their costs. Particularly vexing were over-water or cross-jurisdictional routes that added miles to otherwise short, line-of-sight paths that could be traversed easily by unlicensed NII Band equipment.

⁸ See Joint Board Report at ¶¶ 509 *et seq.*

To meet these real needs for universal service, it is not enough for service-provider connections to run to a single location in a school, library or clinic. There must be connectivity anywhere that information access may be required. "Inside Wire"⁹ offers one way to reach students and teachers throughout a site, but, as noted, the costs of installing elaborate in-building cabling can be substantial, the physical task of wiring can take a long time, and the resulting "local area" network still would offer only a limited set of connection points.

User-provided, unlicensed wireless technologies can offer a real, practical alternative, or enhancement, to internal hard wiring in schools, libraries, and health care facilities. The state of the art and the market for broadband, wireless, unlicensed indoor networks has been slow to develop, reflecting historically tight constraints on the frequencies and technologies that can be used for this purpose¹⁰ and uncertainties about possible radio interference from other occupants of the available frequency bands.¹¹

Currently, the Commission has before it Apple's petition for an "NII Band," which would dramatically increase the unlicensed bandwidth available for very high rate (VHR) indoor networks, as well as for longer-reach, point-to-point "community networks," which can connect near and far users to one another and, through ISPs, to the Internet. Thus, the NII Band can be used to provide universal access where few service providers are prepared to install equipment and provide sufficient bandwidth.

User-provided unlicensed wireless connection capabilities (as well as customer-installed inside wires) offer a special ingredient to the universal service delivery

⁹ "Inside Wire" is the term employed in the Statement of Commissioner Chong to distinguish on-premise proliferation of wired infrastructure, that could conceivably be customer premises equipment, from off-site infrastructure that might be provided by a service provider. Apple interprets use of the term "wiring," here and generally, as possibly including the employment of wireless technologies in lieu of or in addition to hard wires.

¹⁰ Until February 7, 1995, only spread spectrum modulation schemes were permitted in the only immediately-available frequencies for wireless LANs. This had the effect of limiting data rates below those required to support a set of users such as students in a school. On that 1995 date, the Commission designated 10 MHz (2390-2400 MHz) for Data-PCS, in response to Apple's 1991 Petition (RM-7618) for such frequencies. Data-PCS offers local area high speed data communications among personal computing devices, and the frequency band is shared on a secondary basis with the Amateur Service only. Several companies are now engineering products that take advantage of the favorable allocation and rules governing its usage.

¹¹ The bands available for spread spectrum communications are shared with industrial, scientific and medical applications of radio frequency energy, with the Amateur Radio Service, and a variety of licensed communications functions.

mix and introduce an element of competition to the provision of service. If a much lower-cost, user-provided function has sufficient capabilities, a carrier or other service provider would have to offer a superior capability or a lower cost, or both.

C. **The Pace Of Change And The Need For Flexibility**

The Commission is moving very fast in deregulation and in realization of universal service goals. Nonetheless, the Commission's processes are not likely to keep up with the rate of change taking place among service providers, including those who will be expected to deliver universal service.

For example, incumbent telephone companies and cable operators now face competition from an array of new small, medium-sized, and large telecommunications providers, who are encouraged to employ the incumbents' infrastructures. One example is the emergence of ISPs of all sizes. Although some industry observers believe that there are too many competitors with overlapping geographical and functional profiles, the typical Internet user (individual or organization) has to contend with rates of throughput that fall far short of what even the most patient 'Net-surfer can tolerate and short of what the Internet itself can support.

In this environment, we urge the Commission to apply the fewest restrictions and allow the widest possible range of service-provider delivery and user self-provision of universal service. Indeed, the Commission should actively encourage self-provision of universal service, as suggested in Apple's NII Band petition, even to the extent of making user-provided services eligible for direct funding subsidies in lieu of "discounts." Flexibility should be the governing principle for allocation of universal service support.¹²

¹² One recent report underscores the rapidly changing goals and roles of would-be service providers. In an article in the San Jose Mercury News (December 15, 1996, pp. 1 and 28A), staff writer Mike Antonucci describes retrenching of a Bay Area cable operator's ambitious plans "to create a regional showcase for interactive TV, home education, an impeccably reliable signal and perhaps even video phones." He cites the operator's "1.7 million Bay Area subscribers" in this "relatively affluent and technically sophisticated market," but notes that "the sudden emergence of the Internet turned the business upside down, forcing everyone to re-evaluate their plans." In a sidebar headed "Phone-Cable Rivalry Less Than Touted," Antonucci also describes an assortment of major local and regional telecom service providers who have "pulled the plug" and "put aside" plans for a variety of consumer services, including some based on wireless cable technology.

Apple cites this article as one among many appearing throughout the country that report on showcase installations that have been deferred, redefined or canceled, to indicate the criticism directed at certain of the service providers upon whom universal service deployment

CONCLUSION

Apple recognizes that meeting all the expanded goals of universal service is an ambitious undertaking, but questions regarding the scope of universal service support to schools and libraries and rural health facilities are really questions about the future of America. We cannot afford to have a society of "haves" and "have-nots" based on information access. The time has come to lift our sights, harness our resources, and make full use of our opportunities.

Respectfully submitted,

APPLE COMPUTER, INC.



/s/ Lynn C. Silver

Lynn C. Silver

James F. Lovette

APPLE COMPUTER, INC.

Three Infinite Loop, MS: 301-4J

Cupertino, California 95014

(408) 974-1418

OF COUNSEL:

Henry Goldberg

W. Kenneth Ferree

GOLDBERG, GODLES, WIENER & WRIGHT

1229 Nineteenth Street, N.W.

Washington, D.C. 20036

(202) 429-4900

December 19, 1996

plans are based. With the difficulty that service providers are experiencing in finding profit opportunities in "affluent" (and relatively dense) population areas, the plight of universal service subscribers and would-be subscribers in rural areas appears even more grim.

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing Comments of Apple Computer, Inc., was sent by first-class mail, postage prepaid, this 19th day of December, 1996, to each of the following:

The Honorable Reed E. Hundt,
Chairman*
Federal Communications
Commission
1919 M Street, N.W., Room 814
Washington, D.C. 20554

The Honorable Rachelle B. Chong,
Commissioner*
Federal Communications
Commission
1919 M Street, N.W., Room 844
Washington, D.C. 20554

The Honorable Susan Ness,
Commissioner*
Federal Communications
Commission
1919 M Street, N.W., Room 832
Washington, D.C. 20554

The Honorable Julia Johnson,
Commissioner
Florida Public Service Commission
2540 Shumard Oak Blvd.
Gerald Gunter Building
Tallahassee, FL 32399-0850

The Honorable Kenneth McClure,
Commissioner
Missouri Public Service Commission
301 W. High Street, Suite 530
Jefferson City, MO 65101

The Honorable Sharon L. Nelson,
Chairman
Washington Utilities and
Transportation
Commission
P.O. Box 47250
Olympia, WA 98504-7250

The Honorable Laska Schoenfelder,
Commissioner
South Dakota Public Utilities
Commission
State Capitol, 500 E. Capitol Street
Pierre, SD 57501-5070

Martha S. Hogerty
Public Counsel for the State of
Missouri
P.O. Box 7800
Jefferson City, MO 65102

Paul E. Pederson, State Staff Chair
Missouri Public Service Commission
P.O. Box 360
Jefferson City, MO 65102

Lisa Boehley*
Federal Communications
Commission
2100 M Street, N.W., Room 8605
Washington, D.C. 20554

Charles Bolle
South Dakota Public Utilities
Commission
State Capitol, 500 E. Capitol Street
Pierre, SD 57501-5070

Deonne Bruning
Nebraska Public Service Commission
300 The Atrium
1200 N Street, P.O. Box 94927
Lincoln, NE 68509-4927

James Casserly*
Federal Communications
Commission
Office of Commissioner Ness
1919 M Street, Room 832
Washington, D.C. 20554

John Clark*
Federal Communications
Commission
2100 M Street, N.W., Room 8619
Washington, D.C. 20554

Bryan Clopton*
Federal Communications
Commission
2100 M Street, N.W., Room 8615
Washington, D.C. 20554

Irene Flannery*
Federal Communications
Commission
2100 M Street, N.W., Room 8922
Washington, D.C. 20554

Daniel Gonzalez*
Federal Communications
Commission
Office of Commissioner Chong
1919 M Street, N.W., Room 844
Washington, D.C. 20554

Emily Hoffnar*
Federal Communications
Commission
2100 M Street, N.W., Room 8623
Washington, D.C. 20554

L. Charles Keller*
Federal Communications
Commission
2100 M Street, N.W., Room 8918
Washington, D.C. 20554

Lori Kenyon
Alaska Public Utilities Commission
1016 West Sixth Avenue, Suite 400
Anchorage, AK 99501

David Krech*
Federal Communications
Commission
2025 M Street, N.W., Room 7130
Washington, D.C. 20554

Debra M. Kriete
Pennsylvania Public Utilities
Commission
P.O. Box 3265
Harrisburg, PA 17105-3265

Diane Law*
Federal Communications
Commission
2100 M Street, N.W., Room 8920
Washington, D.C. 20554

Mark Long
Florida Public Service Commission
2540 Shumard Oak Blvd.
Gerald Gunter Building
Tallahassee, FL 32399

Robert Loube*
Federal Communications
Commission
2100 M Street, N.W., Room 8914
Washington, D.C. 20554

Samuel Loudenslager
Arkansas Public Service Commission
P.O. Box 400
Little Rock, AR 72203-0400

Sandra Makeeff
Iowa Utilities Board
Lucas State Office Building
Des Moines, IA 50319

Philip F. McClelland
Pennsylvania Office of Consumer
Advocate
1425 Strawberry Square
Harrisburg, Pennsylvania 17120

Michael A. McRae
D.C. Office of the People's Counsel
1133 15th Street, N.W. -- Suite 500
Washington, D.C. 20005

Tejal Mehta*
Federal Communications
Commission
2100 M Street, N.W., Room 8625
Washington, D.C. 20554

Terry Monroe
New York Public Service
Commission
3 Empire Plaza
Albany, NY 12223

John Morabito*
Deputy Division Chief, Accounting
and Audits
Federal Communications
Commission
2000 L Street, N.W., Suite 812
Washington, D.C. 20554

Mark Nadel*
Federal Communications
Commission
2100 M Street, N.W., Room 8916
Washington, D.C. 20554

John Nakahata*
Federal Communications
Commission
Office of the Chairman
1919 M Street, N.W., Room 814

Lee Palagyi
Washington Utilities and
Transportation
Commission
1300 South Evergreen Park Drive
S.W.
Olympia, WA 98504

Kimberly Parker*
Federal Communications
Commission
2100 M Street, N.W., Room 8609
Washington, D.C. 20554

Barry Payne
Indiana Office of the Consumer
Counsel
100 North Senate Avenue, Room
N501
Indianapolis, IN 46204-2208

Jeanine Poltronieri*
Federal Communications
Commission
2100 M Street, N.W., Room 8924
Washington, D.C. 20554

James Bradford Ramsay
National Association of Regulatory
Utility
Commissioners
P.O. Box 684
Washington, D.C. 20044-0684

Brian Roberts
California Public Utilities
Commission
505 Van Ness Avenue
San Francisco, CA 94102

Gary Seigel*
Federal Communications
Commission
2000 L Street, N.W., Suite 812
Washington, D.C. 20554

Richard Smith*
Federal Communications
Commission
2100 M Street, N.W., Room 8605
Washington, D.C. 20554

Pamela Szymczak*
Federal Communications
Commission
2100 M Street, N.W., Room 8912
Washington, D.C. 20554

Lori Wright*
Federal Communications
Commission
2100 M Street, N.W., Room 8603
Washington, D.C. 20554

A handwritten signature in black ink that reads "Dawn Hottinger". The signature is fluid and cursive, with the first letter 'D' being large and prominent.

/s/ Dawn Hottinger
Dawn Hottinger

* By Hand